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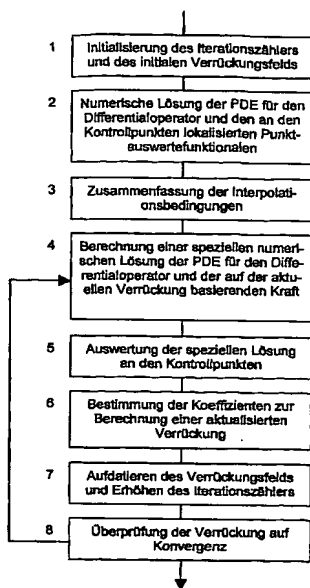
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(54) Title: IMAGE REGISTRATION METHOD

(54) Bezeichnung: VERFAHREN ZUR BILDREGISTRIERUNG



- 1...INITIALIZE ITERATION COUNTER AND INITIAL DISPLACEMENT FIELD
- 2...NUMERICAL SOLUTION OF THE PDE FOR THE DIFFERENTIAL OPERATOR AND THE POINT EVALUATION FUNCTIONALS LOCATED AT THE LANDMARKS
- 3...COMBINE THE INTERPOLATION CONDITIONS
- 4...CALCULATE A SPECIAL NUMERICAL SOLUTION OF THE PDE FOR THE DIFFERENTIAL OPERATOR AND THE FORCE BASED ON THE ACTUAL DISPLACEMENT
- 5...EVALUATE THE SPECIAL SOLUTION AT THE LANDMARKS
- 6...DETERMINE THE COEFFICIENTS IN ORDER TO CALCULATE AN UPDATED DISPLACEMENT
- 7...UPDATE THE DISPLACEMENT FIELD AND INCREASE THE ITERATION COUNTER
- 8...VERIFY WHETHER THE DISPLACEMENT IS CONGRUENT

(57) **Abstract:** Disclosed is an image registration method by iteratively determining a transformation that is optimal regarding a given distance criterion and smoothness criterion. Said method allows corresponding landmarks in the images to be definitely represented on top of each other and comprises the following steps: (1) an iteration counter and the initial displacement field are initialized; (2) the numerical solutions of the non-linear partial differential equation (PDE) are determined by means of the differential operator that can be derived from a predefined smoothness criterion and the point evaluation functionals located at given landmarks; (3) the interpolation conditions are combined; (4) a special numerical solution of the PDE is calculated by means of the force that is determined based on the distance criterion and the actual displacement field as well as the differential operator derived from the smoothness criterion; (5) the special solution is evaluated at the landmarks; (6) the coefficients are calculated in order to calculate an updated displacement; (7) the displacement field is updated and the iteration counter is increased; (8) the displacement is verified regarding convergence; and (9) steps (4) to (8) are repeated if the convergence criterion is not satisfied.

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